

REMARKS/ARGUMENTS

In response to the Office Action mailed January 12, 2005, Applicants amend their application and request continued examination. In this Amendment new dependent claim 8 is added so that claims 1-8 are now pending.

In this Amendment claim 1 is amended by removing a number of limitations and adding a further explanation concerning the arrangements of the infinitesimal mirrors. The limitations removed from claim 1 all appear, with some minor clarification, in the new claim 8. The limitations newly added to claim 1 are supported in the original patent application from page 28, line 23 through page 30, line 18. These limitations define an infinitesimal radiation angle, $d\theta$, in which light rays are reflected from each corresponding infinitesimal mirror. Further, the amended claim 1 defines an infinitesimal distance, dr , at the lamp front glass, along a line perpendicular to the optical axis. Each infinitesimal distance corresponds to a distance along that line where the light rays from a corresponding infinitesimal mirror intersect the line. An important feature of the invention as defined by amended claim 1 is that the ratio $dr/d\theta$ is constant. This requirement defines the shape of the aspherical reflection surface as described at page 30, lines 10-14 of the patent application. The resulting reflector shape has numerous advantages over reflectors of the prior art. For example, the output light flux has suppressed divergent components. Further, all of the light rays from the illuminant are output with an approximately uniform divergence angle, independent of position on the lamp front glass. The image of the illuminant focused at the glass has reduced divergence and reduced loss when incident on a rod integrator.

Several dependent claims are amended to ensure that each claim term has proper antecedent basis.

Claims 1-4 and 6 were rejected as anticipated Akiyama (U.S. Patent 6,688,756) claims 5 and 7 were rejected as unpatentable over Akiyama in view of Karasawa et al. (U.S. Patent 6,491,396, hereinafter Karasawa). It is apparent that both rejections depend upon the anticipation of claim 1 by Akiyama. Because Akiyama does not anticipate at least amended claim 1, the rejections are respectfully traversed.

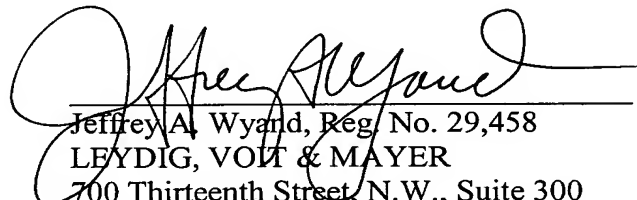
As a fundamental point of differentiation between the invention as defined by amended claim 1 and Akiyama, Akiyama never defines or constrains the shape of the described reflector based upon maintaining constant the ratio $dr/d\theta$. Therefore, Akiyama cannot anticipate any claim now pending.

Applicants agree that Akiyama describes an optical system that provides a limited degree of improvement in achieving a parallel light flux from light rays emitted from the center of an illuminant. However, that result is produced, fundamentally, by correcting spherical aberration, not by controlling reflector shape. In addition, unlike the lamp

according to claim 1, Akiyama does not disclose using both a lamp reflector that is a paraboloid of revolution and a lamp front glass including an aspherical lens surface, symmetrical with respect to the optical axis. The advantages of the invention are achieved through the combination of the shape of the surface of the lamp reflector and the lamp front glass having an aspherical lens structure. Akiyama does not describe the combination of these elements. Further, because, as already described, no constant value of the distribution of the divergence angle $d\theta$, at the outgoing surface of the lamp front lens achieved by Akiyama because of the absence of the combination of the lamp reflector and lamp front glass described in claim 1. Because of these differences, Akiyama cannot anticipate claim 1 nor any other pending claim and cannot, even in combination with the secondary reference, suggest any of the claims now pending.

Reconsideration and allowance of the patent application are appropriate and earnestly solicited.

Respectfully submitted,



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